Introduction to the Business Intelligence & Big Data for Innovative and Sustainable Development of Organizations Mini-track

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This mini-track sought papers that provide a theoretical, conceptual, and/or applied grounded discussion of Business Intelligence (BI) and Big Data (BD) to (1) aid organizations in innovative and sustainable development, (2) provide the added-value to the development of organizations and their decision-making process, (3) support organizational creativity, (4) design intelligent information systems and build decision support systems in organizatons, and (5) use tools and solutions to achieve innovative and sustainable development of organizations.

The mini-track includes four papers. In the first paper titled *Business Analytics Capabilities for Organizational Resilience* Al-Ghattas and Marjanovic argue that at present times organizations face unique challenges created by different disruptions, including natural disasters, new technologies, regulatory changes, and more recently, a global pandemic. Hence, the authors emphasize the need to build, sustain, and continuously enhance Organizational Resilience (OR) that requires high-quality data and business analytics (BA) capabilities. The paper aims to investigate the link between BA and OR by conducting a multidisciplinary literature review on OR and BA, focusing on BA capabilities for OR. Furthermore, the study proposes a conceptual framework of BA capabilities for OR and brings a well-established area of OR to the attention of BA researchers, as a critically important area for further BA research and practice.

In the second paper titled *Applying Machine Learning to Study Infrastructure Anomalies in a Mid-size Data Center – Preliminary Considerations* Janus, Ganzha, Bicki, and Paprzycki report on the progress in developing a comprehensive solution for the root cause of anomalies (RCA) in data centers. They propose a novel anomaly detection model suited for streaming data. The model accounts for different types of anomalies and is applicable to raw data. Based on literature analysis and performed experiments, the authors rejected reconstruction models (PCA and (V)AE) and focused on models operating on individual time series. The experiments showed that OARX model outperforms other models when applied to the Yahoo! dataset. First the model detected anomalies and then clustered based on the time of their occurrence. Next to construct causal graphs, the authors used the PCMCI method. Finally, these casual graphs were interpreted by the EMCA experts and found to match actual/potential problems in the data center.

Employee productivity is crucial to the profitability of the manufacturing and other industries. By capturing employee locations using recent advanced tracking devices, one can analyze and evaluate the time spent during a workday of each individual. However, over time, the quantity of the collected data decreases the capabilities of efficient classification of direct labor costs. In the third paper titled *The adaptive spatio-temporal clustering method in classifying direct labor costs for the manufacturing industry*, Weichbroth, Kalinowski, and Baran showed that the existing clustering methods have failed to deliver satisfactory results by taking advantage of spatial data. The authors proposed the adaptive spatio-temporal clustering (ASTC) method that utilizes both spatial and time data as well as prior data concerning the position and working status of deployed machines inside a factory. The results generated by the ASTC method outperform the bucket of three well-known methods, namely DBSCAN, HDBSCAN and OPTICS. In a series of experiments, the authors validated the underlying assumptions and design of the ASTC method, as well as its efficiency and scalability. The application of the method can help manufacturing companies analyze and evaluate employees, including the productive times of day and most productive locations.

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Finally, the forth paper titled *The Relationship between Online Data Collection and Consumer Autonomy* by Sohaib and Olszak presented preliminary results on the relationship between online data collection and online consumer autonomy in Australia. The authors contended that online data collection can generate tensions for consumers. The Big Data collection can compromise consumers' sense of autonomy, the lack of which can be harmful to consumer privacy, data security, data confidentiality, and data ownership. The study also identified open research questions for future research.